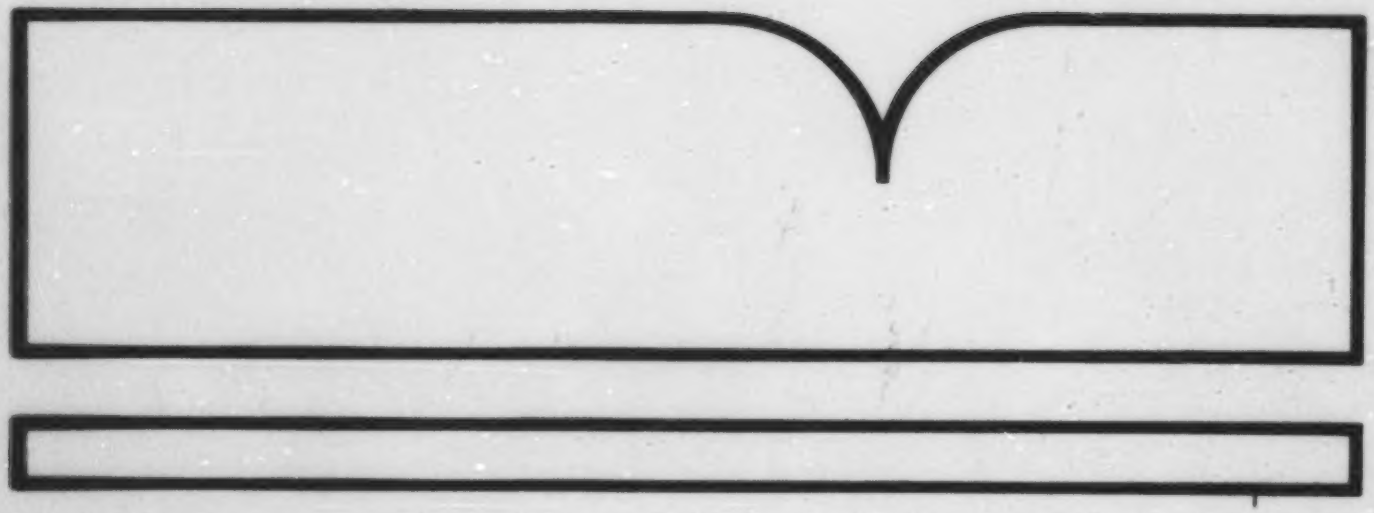
PB84-229467

Calms Processor (CALMPRO) User's Guide

(U.S.) Environmental Protection Agency
Boston, MA

Jun 84



U.S. Department of Commerce
National Technical Information Service
NTIS

50272-101

REPORT DOCUMENTATION PAGE	1. REPORT NO. EPA/DF-84/053a EPA-901/9-84-001	2.	3. Recipient's Accession No. PB84-229467
4. Title and Subtitle: Calms Processor (CALMPRO) User's Guide			5. Report Date: June 1984
			6.
7. Author(s): Margaret Y. Perkins and Stephen S. Perkins			8. Performing Organization Rept. No.
9. Performing Organization Name and Address: U.S. Environmental Protection Agency, Region I, J.F.K. Building, Boston, MA 02203			10. Project/Task/Work Unit No.
			11. Contract(C) or Grant(G) No. (C) (G)
12. Sponsoring Organization Name and Address			13. Type of Report & Period Covered: Final Report
			14.

15. Supplementary Notes

for magnetic tape see PB84-229475

16. Abstract (Limit: 200 words)

The calms processor (CALMPRO) is a computer program that eliminates the influence of calms on pollutant concentrations calculated by air quality dispersion models. The procedure disregards concentrations for hours when the winds are calm. The hour is treated as missing and a convention for handling missing hours is employed. CALMPRO produces statistics on the occurrence of calms in the meteorological data set and recalculates average concentrations for 1-hour, 3-hour, 8-hour, 24-hour, and annual time intervals. Technical details on the processor are presented with complete descriptions of data requirements and output. An example application of CALMPRO and the source program listing are included as appendices.

17. Document Analysis a. Descriptors

Air Pollution
Meteorology
Computer Programs

b. Identifiers/Open-Ended Terms

Calm Winds

c. COSATI Field/Group 04/02

18. Availability Statement: Release Unlimited	19. Security Class (This Report): Unclassified	21. No. of Pages: 45
	20. Security Class (This Page): Unclassified	22. Price: $8.50

(See ANSI-Z39.18) See Instructions on Reverse

OPTIONAL FORM 272 (4-77)
(Formerly NTIS-35)
Department of Commerce

United States
Environmental Protection
Agency Region I

Air Management Division
J.F. Kennedy Federal Building
Boston, MA 02203

EPA-901/9-84-001
JUNE 1984

EPA

CALMS PROCESSOR (CALMPRO) USER'S GUIDE

PB84-229467

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA 22161

EPA-901/9-84-001
June 1984

CALMS PROCESSOR

(CALMPRO)

USER'S GUIDE

U.S. Environmental Protection Agency
Region I
John F. Kennedy Building
Boston, Massachusetts 02203

PREFACE

CALMPRO was developed jointly by Region I's Air Management Division, Technical Support Branch, and Administrative Services Division, Data Management Section. The program was written by Margaret Perkins, based on specifications from the Region's air quality modeling staff. The documentation was prepared by Stephen Perkins.

Inquiries regarding the use of the program should be made to Stephen Perkins at (617) 223-4866. Users within the Federal Government may call FTS 223-4866.

This User's Guide and the computer code is available from the National Technical Information Service (NTIS), Springfield, VA 22161 (phone (703) 487-4763).

Publication No. EPA-901/9-84-001

CALMPRO USER'S GUIDE

		Page
1.	MODEL OVERVIEW	1-1
1.1	Background	1-1
1.2	General Description	1-1
2.	TECHNICAL DESCRIPTION	2-1
2.1	Model Input Data	2-1
2.1.1	Meteorological Input Data	2-1
2.1.2	Modeled Concentration Input Data	2-1
2.2	Identification of Calms	2-1
2.3	Removing the Effect of Calms on Predicted Concentrations	2-2
2.3.1	3-Hour Concentrations	2-2
2.3.2	8-Hour Concentrations	2-2
2.3.3	24-Hour Concentrations	2-2
2.3.4	Annual Concentrations	2-2
3.	USER'S INSTRUCTIONS	3-1
3.1	Program Description	3-1
3.2	Control Language and Data Deck Setup	3-2
3.3	Input Data Description	3-2
3.4	Program Output Description	3-5
3.4.1	Calm Statistics Tables	3-5
3.4.2	Pollutant Concentration Tables	3-5
3.4.3	Pollutant Concentration Tape Output	3-6
APPENDIX A	EXAMPLE PROBLEM	A-1
APPENDIX B	PROGRAM LISTING	B-1

1. MODEL OVERVIEW

1.1 BACKGROUND

EPA has developed a procedure to prevent the occurrence of overly conservative concentration estimates during periods of calms. The calms procedure acknowledges that a Gaussian plume model does not apply during calm conditions and that our knowledge of plume behavior and wind patterns during these conditions does not, at present, permit the development of a better technique. The procedure disregards wind and concentration estimates for hours when the wind speed is less than 1 m/s. The hour is treated as missing and a convention for handling missing hours is recommended.

With the development of a procedure for addressing the calms problem, there arose the need to create a program to apply the calms procedure to EPA reference models. Region I has developed a calms postprocessor (CALMPRO) to meet the need for an efficient method for eliminating the influence of calms in a meteorological data set. Since CALMPRO was developed to implement EPA's calm wind procedure, users of this postprocessor should be thoroughly familiar with that policy to ensure proper application.

1.2 GENERAL DESCRIPTION

CALMPRO can be used in two modes. In the first mode, the program identifies all calm hours in the preprocessed meteorological data. Calms are identified using the criteria of wind speed equal to 1.00 m/s and wind direction the same as the previous hour. Statistics are then tabulated showing the number of calms in each day and in each 3-hour period during the day. Summary statistics for the whole year are also tabulated.

In the second mode, the calm statistics are produced and then a file of predicted concentrations from CRSTER, ISC, RAM MPTER, or COMPLEX I is processed to eliminate the influence of the calm hours. For every calm hour, the concentration at all receptors is set to zero. Short-term average concentrations are then recalculated. The new concentrations are then printed out in high-five tables and all averages affected by the procedure are flagged.

2. TECHNICAL DESCRIPTION

2.1 MODEL INPUT DATA

2.1.1 Meteorological Input Data

Since CALMPRO was developed for use with EPA reference models, it was designed to accept the same meteorological input used with those models. Thus, any meteorological data processed with the CRSTER preprocessor, or its equivalent, can be used in CALMPRO. If CALMPRO is being used to eliminate the influence of calms on modeled concentrations, the input meteorological data set must be the same one used in the original modeling.

2.1.2 Modeled Concentration Input Data

Since calms appear in the meteorological record on an hour-by-hour basis, the user must input hourly concentrations at each receptor to CALMPRO. To simplify this input, CALMPRO was designed to use the output tape/file produced by CRSTER, ISC, RAM, MPTER or COMPLEX I. The user selects the model used and CALMPRO reads the appropriate format. The user is refered to the user's guide for each model for a detailed description of how to exercise that model's tape output option. If ISC is used, the user must specify the hourly concentration option (ISW(7)) and not exercise any of the other averaging time options. The ISC user can also specify as many source groups as desired. Tape output from RAM is restricted to receptors with coordinates specified by the user or the polar receptor network (options 14 or 18). The user may not employ the options for downwind receptors or the honeycomb array.

2.2 IDENTIFICATION OF CALMS

CALMPRO defines a calm hour as an hour with a wind speed of 1.00 m/s and a wind direction the same as the previous hour. The program reads through the entire meteorological record on an hour-by-hour basis, identifying calms and accumulating statistics.

2.3 REMOVING THE EFFECT OF CALMS ON PREDICTED CONCENTRATIONS

When CALMPRO identifies an hour as calm, the concentrations at all receptors are set to zero for that hour. This procedure is followed for every hour of every year being modeled. The program then recalculates concentrations for all averaging times as provided for in EPA's calm wind procedure and as detailed below.

2.3.1 3-Hour Concentrations

For 3-hour averaging periods (midnight to 3 a.m., etc.), the program divides the sum of the hourly contributions by 3.

2.3.2 8-Hour Concentrations

For 8-hour averaging periods (midnight to 8 a.m., etc.), the program divides the sum of the hourly contributions by the number of non-calm hours or 6, whichever is greater. For example, if there are 7 non-calm hours, the sum of the 8 hourly contributions is divided by 7. If there are only 4 non-calm hours, then the sum of the 8 hourly contributions is divided by 6.

2.3.3 24-Hour Concentrations

For 24-hour averaging periods (midnight to midnight), the program divides the sum of the hourly contributions by the number of non-calm hours or 18, whichever is greater. For example, if there are 20 non-calm hours, the sum of the 24 hourly concentrations is divided by 20. If there are only 14 non-calm hours, then the sum of the 24 hourly contributions is divided by 18.

2.3.4 Annual Concentrations

For annual averages, the program divides the sum of all hourly contributions by the number of non-calm hours during the year.

3. USER'S INSTRUCTIONS

3.1 PROGRAM DESCRIPTION

CALMPRO is designed to take files of hourly meteorological data and hourly concentrations from EPA reference models and eliminate the effect of calms on the predicted concentrations. The program also has the option of simply identifying all the calm hours in a meteorological data set and producing statistics on the occurrence of calms.

CALMPRO accepts hourly meteorological input data from a magnetic tape unit or similar external input device. These data are read in a format compatible with the meteorological data format generated by the CRSTER preprocessor program. CALMPRO also accepts hourly predicted concentrations from a magnetic tape unit or similar external input device. These data are read in a format compatible with the output file data format generated by either CRSTER, ISC, RAM, MPTER, or COMPLEX I. These two input files are included as part of the control language in a typical CALMPRO runstream. More detail is provided in Section 3.2. An example problem is contained in Appendix A.

CALMPRO produces two forms of output. Printed output is always in the form of high-five concentration tables for short-term averaging times. The printed output looks like MPTER output in most respects. However, when CRSTER or ISC is used with CALMPRO, the receptor coordinates in the output tables are all shown as zeros. The program may also generate a new output tape/file of hourly concentrations at all receptors. This new file is similar in format to the file generated by ISC.

CALMPRO is written in FORTRAN level 9R1 for execution on a UNIVAC 1100 series computer. CALMPRO is composed of a main program (MAIN) and five subroutines (RNK5, CALMST, IINPUT, MINPUT, and CINPUT). The source code for each of these program elements is listed in Appendix B.

3.2 CONTROL LANGUAGE AND DATA DECK SETUP

The following example illustrates the required control statement runstream for a typical run on the UNIVAC 1100 Series Operating System:

```
@RUN
@ASG,A AQA1*R1-CALMPRO.
@ASG,A METFILE.
@USE 11,METFILE.
@ASG,A CONCFILE.                    Optional
@USE 12,CONCFILE.                   Optional
@ASG,A OUTPUTFILE.                  Optional
@USE 13,OUTPUTFILE.                 Optional
@XQT AQA1*R1-CALMPRO.ABS
 Card input data
@FIN
```

The first control statement initiates the runstream. The second control statement assigns the existing program file to the run. The third and fourth control statements assign an existing meteorological data file (METFILE) and associate FORTRAN logical unit number 11 with the meteorological file. The fifth and sixth control statements assign the file of hourly concentrations (CONCFILE) and associate FORTRAN logical unit number 12 with the concentration file. These statements are not needed if only calm statistics are being processed. The seventh and eighth control statements create an optional output file (OUTPUTFILE) of hourly concentrations and associate FORTRAN logical unit number 13 with the output file. The ninth control statement initiates the execution of CALMPRO. The required card input data immediately follows the execution card. The final control statement terminates the runstream.

The card input data required by CALMPRO consists of just one card. A description of the input format of this card is provided in Section 3.3. An example runstream is shown in Appendix A (page A-6).

3.3 INPUT DATA DESCRIPTION

This section provides the user with the format and order in which the program requires the input data. As mentioned above, the meteorological data and the modeled hourly concentrations are input as part of the control language for a typical run. The user has to input only one data card.

The one data card contains seven parameters which specify the model type; the pollutant; the total number of hours; the number of receptors; the number of source groups (ISC only);

and the tape output formats. The parameter names, required formats and the available options for each are given in Table 3-1. Further details on each parameter are provided below.

Parameter Name	
MODTYP	Mode and Model Type Option - CALMPRO can be operated in two modes. In the first mode, CALMPRO only generates statistics on the occurrence of calms in the meteorological data. In this case, set MODTYP to "S" and no other parameters need to be entered. In the second mode, modeled hourly concentrations are processed to remove the effect of calms. In this case, MODTYP indicates the model used to generate the concentrations ("C" = CRSTER, "I" = ISC, or "M" = MPTER, RAM, or COMPLEX I).
IP	Pollutant Type - Specifies whether SO_2 or TSP is being modeled. A value of "1" indicates SO_2 and a value of "2" indicates TSP.
NT	Number of Hours - Specifies the number of hours in the year being processed.
NR	Number of Receptors - Specifies the number of receptors used in the modeling. Up to 720 receptors can be used.
NGROUP	Number of Source Groups - NGROUP is read only if ISC model input is used. The user must specify the number of source groups used in the original ISC modeling.
JTAP	Tape Output Option - The user may choose to have CALMPRO results written out to tape. (The tape is formatted in the same manner as ISC.) A value of "1" writes the concentrations to tape. A "0" value (the default) does not write output to tape. If the output option is selected, an output file must be assigned in the control language.
ISW15	Annual Averages Tape Output Option - The user may choose to write annual as well as hourly results to tape. A value of "1" writes annual averages to tape. A value of "0" means only hourly averages are written to tape.

TABLE 3-1

Parameter Name	Card Column	Format	Description/ Options
MODTYP	1	A1	Mode and Model Type Option:
			S = Calm statistics only
			C = CRSTER model input
			I = ISC model input
			M = MPTER,RAM or COMPLEX I model input
IP	2	I1	Pollutant Type:
			1 = SO_2
			2 = TSP
NT	3-8	I6	Number of hours input (8760 or 8784)
NR	9-14	I6	Number of receptors input
NGROUP	15-20	I6	Number of source groups (ISC only)
JTAP	21	I1	Tape Output Option:
			0 = No tape output (Default)
			1 = Tape output
ISW15	22	I1	Annual Average Tape Output Option:
			0 = Only hourly average concentration written to tape
			1 = Annual and hourly average concentration written to tape

3.4 PROGRAM OUTPUT DESCRIPTON

CALMPRO generates three categories of program output. The first category includes all statistics related to calms. These tables are printed whenever the program is successfully executed. The second category includes tables of concentrations for five averaging times at all receptors. These tables are printed whenever hourly concentrations are input to the program. The last category is tape output of concentrations for hourly and annual averages at all receptors. This output is optional and must be specifically selected by the user in each run. Further details on each output category are given below.

3.4.1 Calm Statistics Tables

Each successful execution of CALMPRO produces three tables of calm statistics. The first table shows the number of calms in each day, and how they are distributed by three-hour periods (midnight to 3 a.m., etc.) during the day. A separate line is printed for each day of the year. At the end of the year, the total number of calm hours is printed. The second table shows the number of three-hour periods in the year with just one, just two, or three calm hours. The third table shows the number of calendar days in the year with just 1,2,3,...,24 calm hours. Examples of these tables are shown in Appendix A (pages A-7 to A-12).

3.4.2 Pollutant Concentration Tables

If hourly pollutant concentrations are processed to remove the effects of calms, then tables of concentrations for each receptor for 1-hour, 3-hour, 8-hour, 24-hour and annual averages are printed. The tables are printed in the same format used in EPA's MPTER model. The first table presents annual average concentrations at each receptor. The next four tables present the results of the four short-term averaging times. For each receptor, the tables show the five highest concentrations over the year and the time period for each. Wherever a concentration is affected by the elimination of one or more calm hours, the printed concentration has the letter "C" printed right next to it. In this way, the user can quickly identify those concentrations affected by calm hours. Examples of these tables are shown in Appendix A (pages A-13 and A-14).

The order in which receptors are listed in the output depends on the model used to generate the input. If MPTER, COMPLEX I or RAM is used, the CALMPRO output will be in the same order and format, including the receptor coordinates. If CRSTER is used, the CALMPRO output will be ordered by receptor ring, and within each ring, by the 36 directional azimuths. This means that receptors 1-36 correspond to the 36 directions, starting with 10°, on the first receptor ring. Receptors 37-72 correspond to the second ring, and so on. The receptor coordinates will all be printed as zeros.

If ISC is used, the CALMPRO output will depend on the nature of the receptor network. If a rectangular grid is used, the sequence of receptors starts in the lower left (SW) corner and proceeds along the lower edge of the grid to the lower right (SE) corner. The sequence then returns and continues in this left-to-right manner while moving up the grid. If a polar grid is used, the sequence of receptors starts with the first ring distance and proceeds outward along the first radial. The sequence then returns to the first ring distance along the second radial, and so on to the last ring distance on the last radial. If discrete receptors are used, they follow the gridded receptors in the same sequence they were entered into ISC. If more than one source group is modeled, a complete set of tables will be generated for each group in the same order as the groups are specified in ISC. Again, the CALMPRO receptor coordinates will be printed as zeros.

3.4.3 Pollutant Concentration Tape Output

CALMPRO is capable of generating an output file containing calculated hourly and annual concentrations at each receptor for each source group. The output file is written with a FORTRAN unformatted (binary) WRITE statement and consists of constant length records whose length equals the total number of receptor points plus three words. For each record, word 1 specifies the hour number, word 2 contains the Julian Day, and word 3 contains the source group number. The remaining words contain the calculated concentrations for that hour for each receptor in the same order they occur in the printed tables. Thus, for any source group there will be 8760 or 8784 records, one for each hour. If the annual concentration option is used, one additional record will be written. Word 1 is 24, word 2 is the total number of days (365 or 366), and word 3 contains the source group number. The remaining words contain the calculated annual average concentrations for each receptor. If more than one source group is used, the same series of records follow for each source group.

APPENDIX A

EXAMPLE PROBLEM

This Appendix presents an example showing the use of CALMPRO in conjunction with MPTER output. MPTER is used to calculate SO_2 concentrations at ten receptors from one point source. The meteorology used in MPTER is from Cincinnati, OH (surface) and Dayton, OH (upper air) for the year 1964. The printed output from MPTER is shown on pages A-2 to A-5. Note that option 22 was used to create an output file of hourly concentrations.

The hourly concentration file produced by MPTER and the meteorological data file are used as input to CALMPRO. An input runstream for CALMPRO for this problem is shown on page A-6.

The output from CALMPRO is shown on pages A-7 to A-15. Pages A-7 to A-13 show the calms statistics for the meteorological data set. Pages A-14 and A-15 show the recalculated concentrations. Note that concentrations affected by the CALMPRO procedure are marked with a "C" in the output tables.

```
                    MPTER  (VERSION 81350)
                    AN AIR QUALITY DISPERSION MODEL TN
                    SECTION 2, NON-GUIDELINE MODELS,
                    IN UNAMAP (VERSION 5) DEC 82
                    SOURCE: UNAMAP FILE ON EPA'S UNIVAC 1110, RTP, NC,

                                    MPTER - VERSION 81350
MPTER RUN FOR TEST OF CALMPRO
1964 CINCINATI SURFACE, DAYTON UPPER AIR
AT TEN DISCRETE RECEPTORS

                              GENERAL INPUT INFORMATION

 THIS RUN OF MPTER-VERSION 81350 IS FOR THE POLLUTANT SO2  FOR 366  24-HOUR PERIODS.
 CONCENTRATION ESTIMATES BEGIN ON HOUR- 1, JULIAN DAY- 1, YEAR-1964.
 A FACTOR OF      1.0000000 HAS BEEN SPECIFIED TO CONVERT USER LENGTH UNITS TO KILOMETERS.
  0 SIGNIFICANT SOURCES ARE TO BE CONSIDERED.
THIS RUN WILL NOT CONSIDER ANY POLLUTANT LOSS.
 HIGH-FIVE SUMMARY CONCENTRATION TABLES WILL BE OUTPUT FOR   4 AVERAGING PERIODS.
 AVG TIMES OF 1,3,8, AND 24 HOURS ARE AUTOMATICALLY DISPLAYED.
  A FACTOR OF       .3048000 HAS BEEN SPECIFIED TO CONVERT USER HEIGHT UNITS TO METERS.

 OPTION    OPTION LIST                        OPTION SPECIFICATION : 0= IGNORE OPTION
                                                                     1= USE OPTION
                        TECHNICAL OPTIONS
      1    TERRAIN ADJUSTMENTS                                      1
      2    DO NOT INCLUDE STACK DOWNWASH CALCULATIONS               1
      3    DO NOT INCLUDE GRADUAL PLUME RISE CALCULATIONS           1
      4    CALCULATE INITIAL PLUME SIZE                             0
                        INPUT OPTIONS
      5    READ MET DATA FROM CARDS                                 0
      6    READ HOURLY EMISSIONS                                    0
      7    SPECIFY SIGNIFICANT SOURCES                              0
      8    READ RADIAL DISTANCES TO GENERATE RECEPTORS              0
                        PRINTED OUTPUT OPTIONS
      9    DELETE EMISSIONS WITH HEIGHT TABLE                       1
     10    DELETE MET DATA SUMMARY FOR AVG PERIOD                   1
     11    DELETE HOURLY CONTRIBUTIONS                              1
     12    DELETE MET DATA ON HOURLY CONTRIBUTIONS                  1
     13    DELETE FINAL PLUME RISE CALC ON HRLY CONTRIBUTIONS       1
     14    DELETE HOURLY SUMMARY                                    1
     15    DELETE MET DATA ON HRLY SUMMARY                          1
     16    DELETE FINAL PLUME RISE CALC ON HRLY SUMMARY             1
     17    DELETE AVG-PERIOD CONTRIBUTIONS                          1
     18    DELETE AVERAGING PERIOD SUMMARY                          1
     19    DELETE AVG CONCENTRATIONS AND HI-5 TABLES                0
                        OTHER CONTROL AND OUTPUT OPTIONS
     20    RUN IS PART OF A SEGMENTED RUN                           0
     21    WRITE PARTIAL CONC TO DISK OR TAPE                       0
     22    WRITE HOURLY CONC TO DISK OR TAPE                        1
     23    WRITE AVG-PERIOD CONC TO DISK OR TAPE                    0
     24    PUNCH AVG-PERIOD CONC ONTO CARDS                         0

ANEMOMETER HEIGHT IS:      6.01
EXPONENTS FOR POWER- LAW WIND INCREASE WITH HEIGHT ARE: .07, .07, .10, .15, .35, .55
TERRAIN ADJUSTMENTS ARE:  .000, .000, .000, .000, .000, .000
```

12
A-2

POINT SOURCE INFORMATION

SOURCE	EAST COORD (USER UNITS)	NORTH COORD (USER UNITS)	SO2(G/SEC) EMISSIONS	PART(G/SEC) EMISAIONS	STACK HT(M)	STACK TEMP(K)	STACK DIAM(M)	STACK VEL(M/SEC)	POTEN. IMPACT (MICRO G/M**3)	EFF HT(M)	GRD-LVL ELEV USER HT UNITS	BUOY FLUX F M**4/S**3
1 STACK 1	99.20	79.30	3000.00	.00	100.0	419.0	2.6	30.4	1490.50	362.60	200.00	151.70

ADDITIONAL INFORMATION ON SOURCES.

EMISSION INFORMATION FOR 1 (NPT) POINT SOURCES HAS BEEN INPUT
0 SIGNIFICANT POINT SOURCES(NSIGP) ARE TO BE USED FOR THIS RUN
THE ORDER OF SIGNIFICANCE(INPS) FOR 25 OR LESS POINT SOURCES USED IN THIS RUN AS LISTED BY POINT SOURCE NUMBER:

SURFACE MET DATA FROM STATION(ISFCD) 93814, YEAR(ISFCYR) 1964
MIXING HEIGHT DATA FROM STATION(IMXD) 93815, YEAR(IMXYR) 1964

RECEPTOR INFORMATION

RECEPTOR	IDENTIFICATION	EAST COORD (USER UNITS)	NORTH COORD	ABV LOCAL GRD LVL (METERS)	RECEPTOR HT	RECEPTOR GROUND LEVEL ELEVATION (USER HT UNITS)
1	1	99,870	83,250	.0		500.0
2	2	94,400	75,140	.0		500.0
3	3	93,310	76,070	.0		500.0
4	4	94,180	75,700	.0		500.0
5	5	92,600	76,850	.0		500.0
6	6	95,000	73,800	.0		500.0
7	7	95,870	73,400	.0		500.0
8	8	96,840	72,250	.0		500.0
9	9	95,000	74,000	.0		500.0
10	10	95,280	72,830	.0		500.0

A-3

13

* ONE ASTERISK INDICATES THAT THE ASSOCIATED RECEPTOR(S) HAVE A GROUND LEVEL ELEVATION LOWER THAN THE LOWEST SOURCE BASE ELEVATION. CAUTION SHOULD BE USED IN INTERPRETING CONCENTRATIONS FOR THESE RECEPTORS.
** TWO ASTERISKS INDICATE THAT THE ASSOCIATED RECEPTOR(S) HAVE GROUND LEVEL ELEVATIONS ABOVE THE LOWEST STACK TOP. CONSEQUENTLY NO CALCULATIONS WILL BE PERFORMED WITH THIS RECEPTOR. A SERIES OF ASTERISKS WILL INSTEAD APPEAR IN THE OUTPUT.

MPTER - VERSION 81350

MPTER RUN FOR TEST OF CALMPRO
1964 CINCINATI SURFACE, DAYTON UPPER AIR
AT TEN DISCRETE RECEPTORS

RECEPTORS

RECEPTOR	IDENTIFICATION	EAST COORD (USER UNITS)	NORTH COORD	RECEPTOR HT ABV LOCAL GRD LVL (METERS)	RECEPTOR GROUND LEVEL ELEVATION (USER HT UNITS)	DAY	AVG CONC FOR PERIOD 1,HR 1, TO DAY366,HR24, (MICROGRAMS/M**3)
1	1	99.87	83.25	.0	500.0		* 44.76
2	2	94.40	75.14	.0	500.0		25.76
3	3	93.31	76.07	.0	500.0		25.03
4	4	94.18	75.70	.0	500.0		29.36
5	5	92.60	76.85	.0	500.0		23.67
6	6	95.00	73.80	.0	500.0		21.70
7	7	95.87	73.40	.0	500.0		17.99
8	8	96.84	72.25	.0	500.0		23.24
9	9	95.00	74.00	.0	500.0		22.28
10	10	95.28	72.83	.0	500.0		16.83

FIVE HIGHEST 1-HOUR SO2 CONCENTRATIONS((ENDING ON JULIAN DAY, HOUR)
(MICROGRAMS/M**3)

RECEPTOR	1	2	3	4	5
1(99.87, 83.25)	2809.44 (165, 2)	2772.55 (235, 2)	2742.83 (128,20)	2740.30 (195,24)	2683.40 (276, 5)
2(94.40, 75.14)	2688.92 (122,20)	2289.80 (229,20)	2270.93 (245,22)	2231.50 (150,22)	2224.43 (258, 6)
3(93.31, 76.07)	2827.44 (163,20)	2794.95 (242,20)	2551.32 (249,22)	2546.26 (285, 7)	2519.19 (59, 5)
4(94.18, 75.70)	2871.20 (361, 3)	2598.99 (305, 8)	2592.00 (138,20)	2530.73 (109,21)	2434.88 (212,20)
5(92.60, 76.85)	2897.03 (174, 5)	2602.23 (201, 3)	2570.23 (164, 5)	2520.75 (203, 1)	2512.27 (263,20)
6(95.00, 73.80)	3134.67 (178,22)	2461.13 (218,20)	2454.77 (304, 4)	2343.43 (58,20)	2320.73 (313,21)
7(95.87, 73.40)	3073.73 (146, 7) *	2942.47 (281, 8)	2425.81 (271,22)	2306.67 (312, 5)	2282.55 (304, 1)
8(96.84, 72.25)	3104.68 (227, 6)	2903.52 (35, 8)	2808.06 (203,20)	2748.97 (222, 6)	2598.96 (200, 8)
9(95.00, 74.00) *	3172.71 (170,22)	2819.52 (58,20)	2543.48 (218,20)	2435.10 (313,21)	2422.23 (310,21)
10(95.28, 72.83)	2880.47 (146, 7)	2678.63 (212, 6)	2583.76 (312, 6)	2472.81 (329, 4)	2415.99 (312,19)

FIVE HIGHEST 8-HOUR SO2 CONCENTRATIONS((ENDING ON JULIAN DAY, HOUR)
(MICROGRAMS/M**3)

RECEPTOR	1	2	3	4	5
1(99.87, 83.25)	1628.65 (359, 6)	1460.45 (17,24)	1491.20 (23, 6)	1227.82 (19, 9)	1190.77 (351,18)
2(94.40, 75.14)	1475.95 (229,21)	1450.39 (141,24)	1446.85 (313,24)	1436.47 (245,24)	1324.46 (67,21)
3(93.31, 76.07)	1241.26 (311,21)	1190.34 (180, 3)	1141.44 (304,18)	1028.04 (95, 3)	1022.36 (41,12)
4(94.18, 75.70)	1392.23 (177, 3)	1380.04 (206, 6)	1351.87 (300, 9)	1269.54 (272, 3)	1196.19 (218,24)
5(92.60, 76.85)	1399.07 (213, 6)	1268.08 (187, 6)	1127.62 (164, 6)	1094.36 (116,21)	1093.58 (318,24)
6(95.00, 73.80)	1826.58 (35, 3)	1713.77 (304, 6)	1563.04 (33,21)	1526.38 (179, 3)	1406.65 (218,21)
7(95.87, 73.40)	1416.57 (281, 9)	1333.02 (312, 6)	1324.19 (140, 6)	1215.82 (243,24)	1068.23 (163, 3)
8(96.84, 72.25) *	2156.09 (203,21) *	1838.29 (303,24)	1471.14 (35, 9)	1195.24 (217,24)	1132.01 (227, 6)
9(95.00, 74.00)	1497.61 (304, 6)	1344.63 (12,18)	1335.02 (218,21)	1293.86 (33,21)	1162.33 (309, 9)
10(95.28, 72.83)	1652.46 (258, 3)	1429.48 (281, 9)	1180.40 (312, 6)	960.17 (146, 9)	934.79 (163, 3)

FIVE HIGHEST 8-HOUR SO2 CONCENTRATIONS((ENDING ON JULIAN DAY, HOUR)
(MICROGRAMS/M**3)

RECEPTOR	1	2	3	4	5
1(99.87, 83.25)	836.04 (23, 8)	702.64 (24,24)	659.99 (351,24)	627.36 (128,24)	621.92 (74, 8)
2(94.40, 75.14)	764.20 (116, 8)	756.34 (141,24)	727.12 (115,24)	695.11 (245,24)	649.48 (219, 8)
3(93.31, 76.07)	630.97 (95, 8)	583.95 (272, 8)	550.31 (14, 8)	532.83 (59, 8)	514.23 (163,24)

A-4 14

4(94.18, 78.70)	1104.73	(177, 8)	799.04	(272, 8)	703.61	(314, 8)	693.24	(119,24)	626.03	(288, 8)
5(92.60, 76.85)	820.44	(116,24)	754.81	(213, 8)	686.26	(142, 8)	660.99	(305, 8)	618.34	(181, 8)
6(95.00, 73.80)	988.47	(309, 8)	851.74	(33,24)	733.92	(304, 8)	684.97	(39, 8)	681.72	(256, 8)
7(95.87, 73.40)	1095.69	(146, 8)	853.21	(281, 8)	683.32	(312, 8)	558.70	(258, 8)	545.36	(304, 8)
8(96.84, 78.28)	955.77	(303,24)	808.51	(203,24)	689.91	(227, 8)	619.88	(362, 8)	611.81	(217,24)
9(95.00, 74.00) * 1158.80	(309, 8) *	908.94	(33,24)	762.63	(149, 8)	753.32	(304, 8)	740.56	(256, 8)
10(96.30, 78.83)	917.40	(858, 8)	782.07	(281, 8)	861.88	(146, 8)	829.36	(304, 8)	651.42	(312, 8)

FIVE HIGHEST 24-HOUR SO2 CONCENTRATIONS((ENDING ON JULIAN DAY, HOUR)
(MICROGRAMS/M**3)

RECEPTOR	1	2	3	4	5
1(99.87, 83.25)	473.01 (351,24)	348.09 (23,24)	312.37 (359,24)	291.42 (318,24)	279.16 (74,24)
2(94.40, 78.14)	499.30 (115,24)	380.90 (257,24)	366.29 (116,24)	336.87 (272,24)	308.90 (141,24)
3(93.31, 76.07)	387.42 (98,24)	336.68 (272,24)	296.99 (274,24)	273.98 (12,24)	271.88 (163,24)
4(94.18, 78.70)	478.88 (272,24) *	487.48 (177,24)	442.20 (115,24)	399.62 (98,24)	289.10 (280,24)
5(92.60, 76.85) *	811.57 (305,24)	347.21 (116,24)	274.44 (181,24)	262.25 (142,24)	259.28 (98,24)
6(95.00, 73.80)	489.95 (256,24)	329.40 (309,24)	303.92 (33,24)	265.69 (118,24)	248.42 (304,24)
7(95.87, 73.40)	368.75 (146,24)	284.40 (281,24)	259.27 (312,24)	236.52 (243,24)	213.01 (255,24)
8(96.84, 78.28)	460.87 (203,24)	359.01 (362,24)	350.13 (217,24)	318.89 (303,24)	310.21 (290,24)
9(95.00, 74.00)	491.38 (256,24)	386.27 (309,24)	302.98 (33,24)	287.05 (118,24)	281.78 (12,24)
10(96.30, 78.83)	306.88 (860,24)	260.60 (281,24)	264.20 (310,24)	194.10 (146,24)	189.19 (304,24)

Reproduced from best available copy.

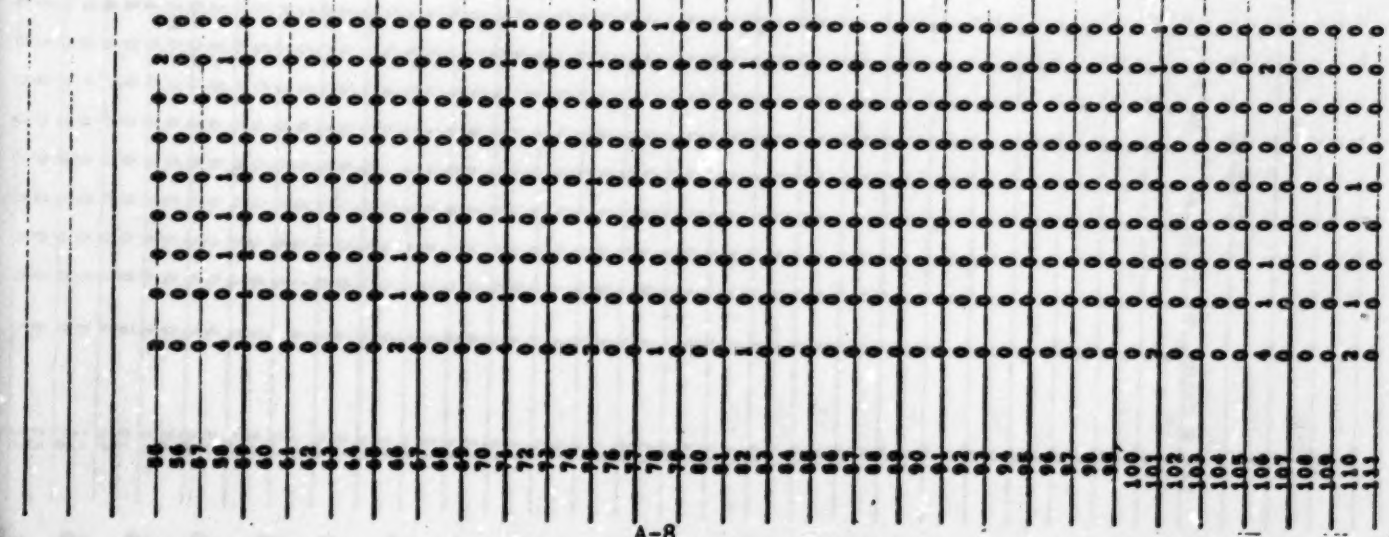
```
1       @RUN
2       @ASG,A/R PREP64*S93814U93815.
3       @USE 11,PREP64*S93814U93815.
4       @ASG,A/R MPTEROUT.
5       @USE 12,MPTEROUT.
6       @ASG,A CALMPRO.
7       @XQT CALMPRO.ABS
8       M1  8784    10     1
9       @FIN
```

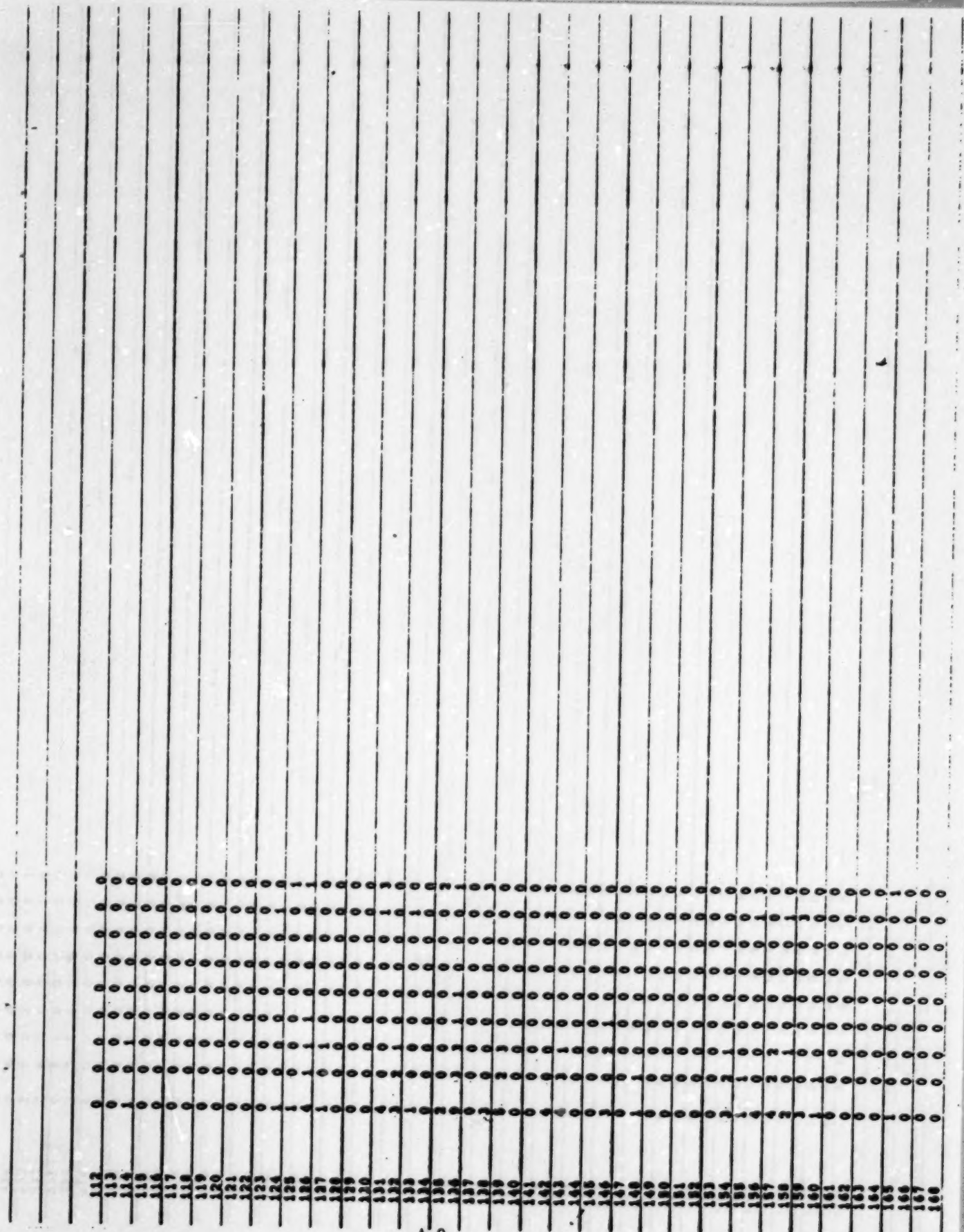

91

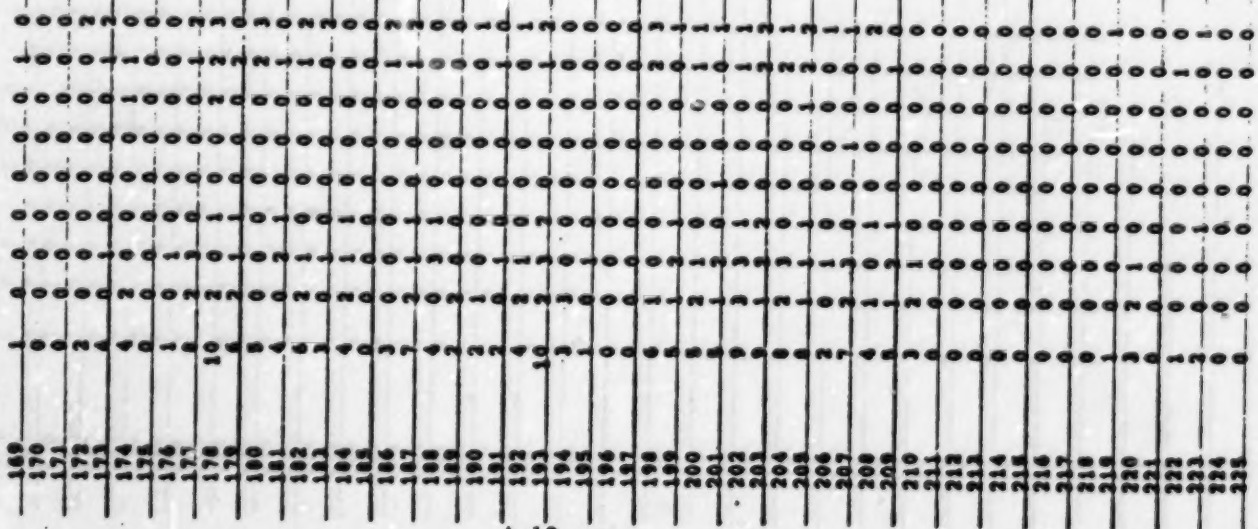
CALMPRO

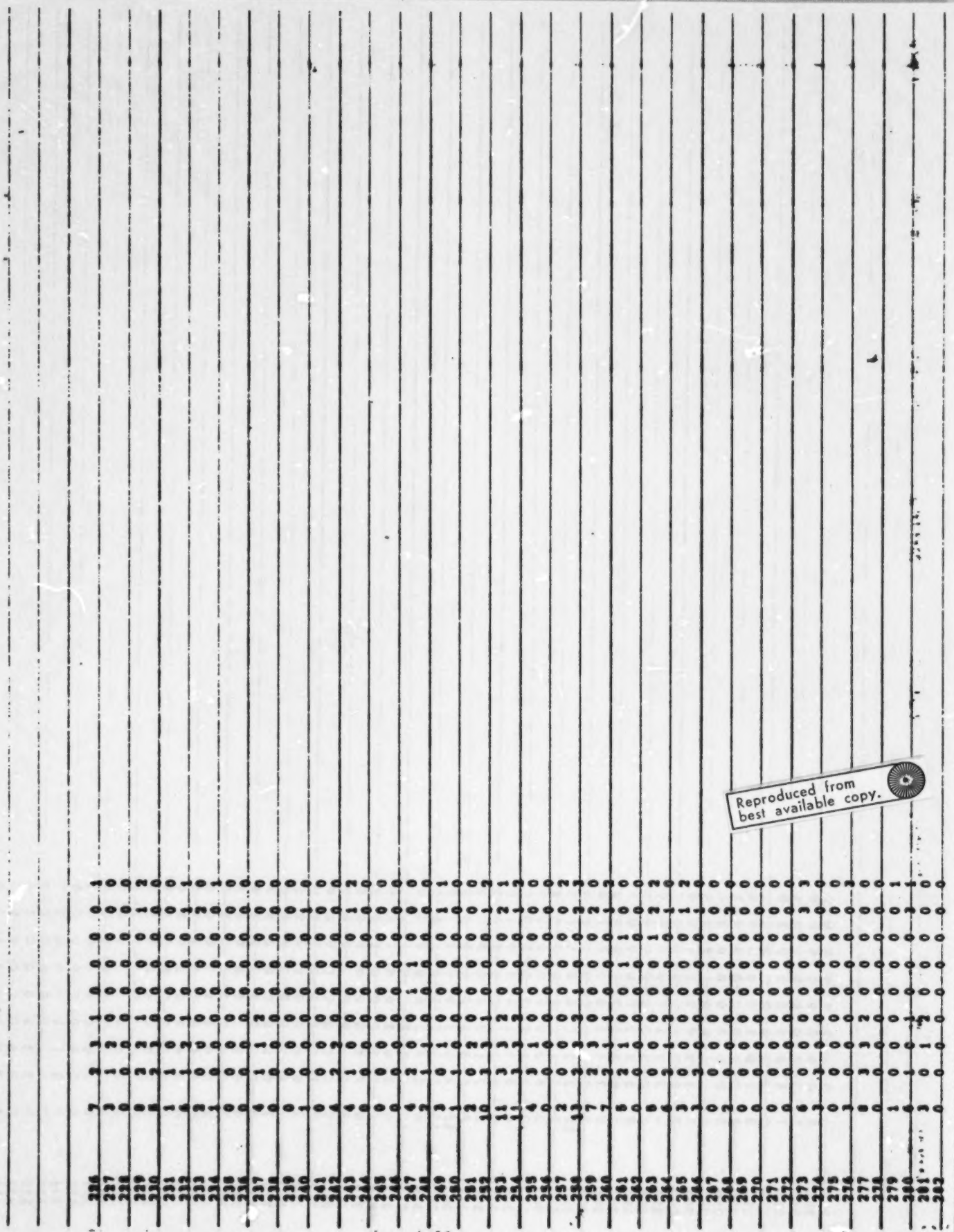
DAY #	CALMS	P1	P2	P3	P4	P5	P6	P7	P8
1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	0
10	4	0	0	0	0	0	0	2	2
11	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0
14	2	0	2	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0
17	3	1	1	1	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0
19	0	0	0	0	0	0	0	0	0
20	0	0	0	0	0	0	0	0	0
21	0	0	0	0	0	0	0	0	0
22	0	0	0	0	0	0	0	0	0
23	3	0	0	0	0	0	0	2	1
24	0	0	0	0	0	0	0	0	0
25	0	0	0	0	0	0	0	0	0
26	0	0	0	0	0	0	0	0	0
27	4	0	2	2	0	0	0	0	0
28	2	0	0	0	0	0	0	2	0
29	1	1	0	0	0	0	0	0	0
30	4	0	0	1	1	1	1	0	0
31	1	0	0	0	1	0	0	0	0
32	0	0	0	0	0	0	0	0	0
33	4	0	2	1	1	0	0	0	0
34	0	0	0	0	0	0	0	0	0
35	8	2	1	1	0	1	0	2	1
36	1	0	1	0	0	0	0	0	0
37	0	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	0	0
39	1	0	0	0	0	0	0	0	1
40	1	0	1	0	0	0	0	0	0
41	1	1	0	0	0	0	0	0	0
42	1	0	0	0	0	0	0	1	0
43	0	0	0	0	0	0	0	0	0
44	0	0	0	0	0	0	0	0	0
45	2	0	0	0	0	0	0	1	1
46	0	0	0	0	0	0	0	0	0
47	0	0	0	0	0	0	0	0	0
48	1	0	0	0	0	0	0	0	1
49	0	0	0	0	0	0	0	0	0
50	0	0	0	0	0	0	0	0	0
51	0	0	0	0	0	0	0	0	0
52	0	0	0	0	0	0	0	0	0
53	4	0	0	0	0	0	0	1	3
54	0	0	0	0	0	0	0	0	0

A-7

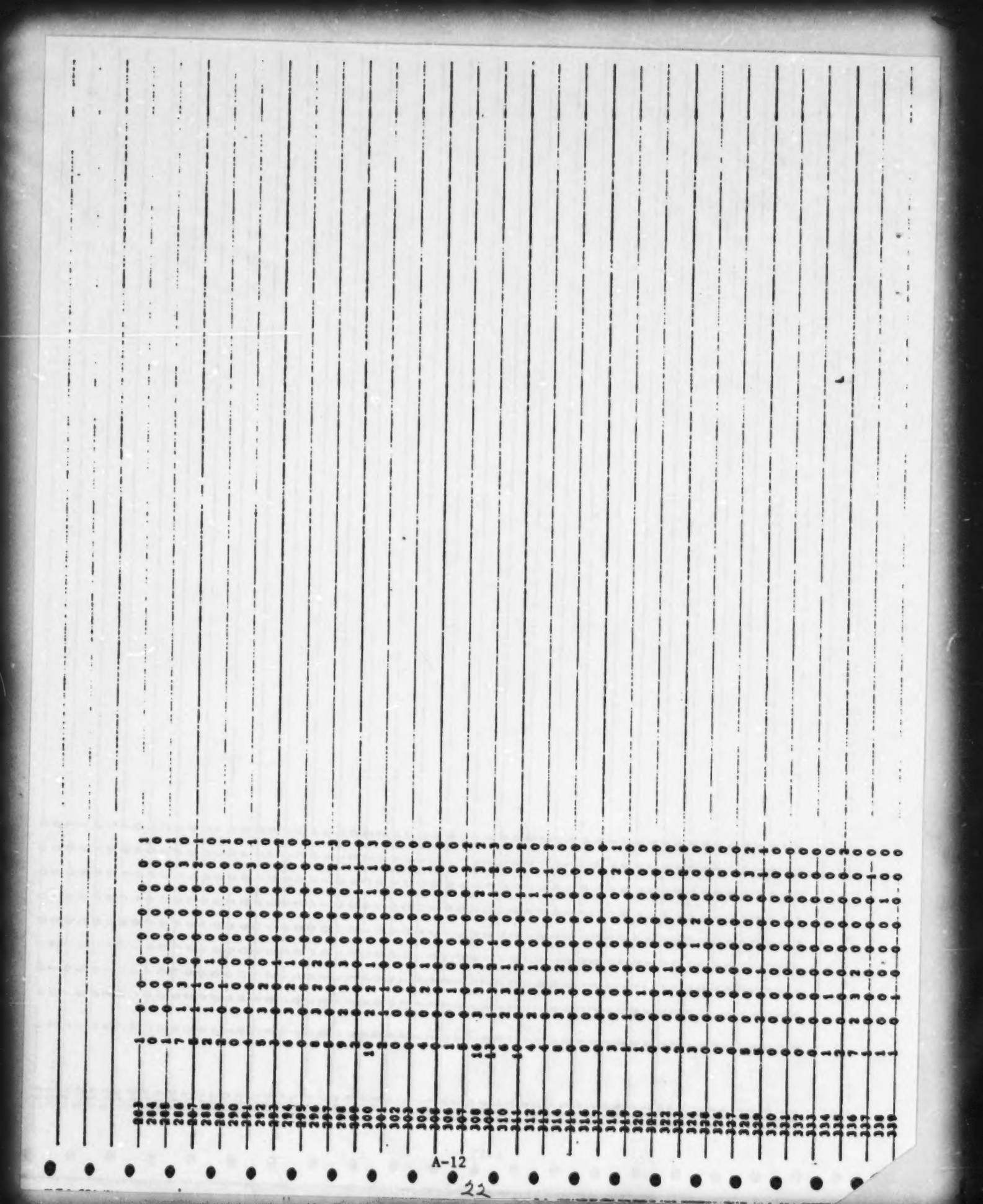








Reproduced from
best available copy.



340	0	0	0	0	0	0	0	0	0
341	2	0	0	0	0	0	0	0	2
342	1	1	0	0	0	0	0	0	0
343	0	0	0	0	0	0	0	0	0
344	2	0	1	1	0	0	0	0	0
345	0	0	0	0	0	0	0	0	0
346	0	0	0	0	0	0	0	0	0
347	0	0	0	0	0	0	0	0	0
348	0	0	0	0	0	0	0	0	0
349	0	0	0	0	0	0	0	0	0
350	1	0	0	0	1	0	0	0	0
351	0	0	0	0	0	0	0	0	0
352	0	0	0	0	0	0	0	0	0
353	7	0	0	0	0	0	2	3	2
354	0	0	0	0	0	0	0	0	0
355	8	0	0	0	0	0	2	3	3
356	8	3	3	2	0	0	0	0	0
357	0	0	0	0	0	0	0	0	0
358	0	0	0	0	0	0	0	0	0
359	0	0	0	0	0	0	0	0	0
360	1	0	0	0	0	0	1	0	0
361	0	0	0	0	0	0	0	0	0
362	0	0	0	0	0	0	0	0	0
363	1	0	0	1	0	0	0	0	0
364	0	0	0	0	0	0	0	0	0
365	0	0	0	0	0	0	0	0	0
366	6	1	3	2	0	0	0	0	0

TOTAL NUMBER OF CALM HOURS
714

NUMBER OF 3-HR PERIODS WITH
1 2 3 CALM HRS
233 137 69

NUMBER OF 24-HR PERIODS WITH

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	CALM HRS
42	29	23	11	15	10	8	10	4	5	2	0	2	0	0	1	0	0	0	0	0	0	0	0	

10 STATIONS WILL BE PROCESSED IN THIS RUN OF CALMPRO.

MPTER RUN FOR TEST OF CALMPRO
1964 CINCINATI SURFACE, DAYTON UPPER AIR
AT TEN DISCRETE RECEPTORS

RECEPTORS

RECEPTOR	IDENTIFICATION	EAST COORD (USER UNITS)	NORTH COORD	RECEPTOR HT ABV LOCAL GRD LVL (METERS)	RECEPTOR GROUND LEVEL ELEVATION (USER HT UNITS)	DAY	AVG CONC FOR PERIOD 1,HR 1, TO DAY366,HR24. (MICROGRAMS/M**3)
1		99.87	83.25				* 47.85 C
2		94.40	75.14				25.84 C
3		93.31	76.07				25.17 C
4		94.18	75.70				28.64 C
5		92.60	76.85				24.58 C
6		95.00	73.80				20.45 C
7		95.87	73.40				17.22 C
8		96.84	72.25				23.33 C
9		95.00	74.00				21.23 C
10		95.28	72.83				15.68 C

A-14

241

FIVE HIGHEST 1-HOUR SO2 CONCENTRATIONS((ENDING ON JULIAN DAY, HOUR)
(MICROGRAMS/M**3)

RECEPTOR			1		2		3		4		5	
1(	99.87,	83.25)	2809.44	(165, 2)	2772.55	(235, 2)	2742.83	(128,20)	2740.30	(195,24)	2683.40	(270, 5)
2(	94.40,	75.14)	2688.92	(122,20)	2289.80	(229,20)	2270.93	(245,22)	2231.60	(150,22)	2224.43	(250, 8)
3(	93.31,	76.07)	2827.44	(163,20) *	2794.95	(242,20)	2551.32	(249,22)	2546.26	(285, 7)	2469.64	(281, 4)
4(	94.18,	75.70)	2871.20	(361, 3)	2598.99	(305, 8)	2592.00	(138,20)	2530.73	(109,21)	2434.88	(212,20)
5(	92.60,	76.85) *	2897.03	(174, 5)	2602.23	(201, 3)	2570.23	(164, 5)	2520.75	(203, 1)	2512.27	(263,20)
6(	95.00,	73.80)	2461.13	(218,20)	2454.77	(304, 4)	2320.73	(318,21)	2308.72	(318,21)	2285.27	(33,20)
7(	95.87,	73.40)	2425.81	(271,22)	2388.67	(312, 5)	2382.55	(304, 1)	2315.48	(281, 3)	2289.63	(34, 7)
8(	96.84,	72.25)	2748.97	(222, 6)	2598.96	(208, 5)	2549.79	(203, 6)	2435.18	(218, 4)	2414.81	(42, 8)
9(	95.00,	74.00)	2543.48	(218,20)	2435.10	(313,21)	2422.23	(318,21)	2381.14	(309, 3)	2300.37	(232, 1)
10(	95.28,	72.83)	2678.63	(212, 6)	2583.74	(312, 6)	2472.81	(329, 4)	2415.99	(312,19)	2291.67	(304, 8)

FIVE HIGHEST 3-HOUR SO2 CONCENTRATIONS((ENDING ON JULIAN DAY, HOUR)
(MICROGRAMS/M**3)

RECEPTOR			1		2		3		4		5	
1(	99.87,	83.25)	1628.65	(359, 6)	1460.45	(17,24)	1391.20	(23, 6)	1227.82	(19, 9)	1190.77	(351,18)
2(	94.40,	75.14)	1450.32	(141,24)	1436.47	(245,24)	1324.46	(67,21)	1285.00	(219, 6)	1252.62	(118,21)
3(	93.31,	76.07)	1190.34	(180, 3)	1141.44	(304,18)	1028.04	(95, 3)	1022.36	(41,12)	942.68	(163,21)
4(	94.18,	75.70)	1269.54	(272, 3)	1196.19	(218,24)	1195.17	(95,21)	1074.49	(95, 6)	1031.30	(272,12)
5(	92.60,	76.85)	1399.07	(213, 6)	1127.62	(164, 6)	1094.36	(110,21)	1077.66	(12,12)	1059.62	(95, 9)
6(	95.00,	73.80)	1563.04	(33,21) *	1486.65	(218,21)	1278.26	(14,18)	1146.49	(94,21)	1140.56	(13, 3)
7(	95.87,	73.40)	1333.02	(312, 6)	1068.23	(163, 3)	987.36	(255,24)	829.81	(271,24)	806.81	(330, 9)
8(	96.84,	72.25) *	1838.29	(303,24)	1195.24	(217,24)	1023.39	(364, 3)	987.03	(42, 9)	968.97	(222, 6)
9(	95.00,	74.00)	1344.63	(12,18)	1335.02	(218,21)	1293.86	(33,21)	1146.37	(13, 3)	1103.92	(149, 3)
10(	95.28,	72.83)	1180.40	(312, 6)	934.79	(163, 3)	892.88	(214, 6)	824.27	(329, 6)	805.78	(312,21)

FIVE HIGHEST 8-HOUR SO2 CONCENTRATIONS((ENDING ON JULIAN DAY, HOUR)

(MICROGRAMS/M**3)

RECEPTOR		1	2	3	4	5
1(99.87, 83.25)	838.06 (23, 8)	702.86 (24,24)	659.99 (351,24)	627.30 (120,24)	621.92 (76, 8)
2(94.40, 75.14)	764.20 (116, 8)	756.14 (141,24)	727.12 (115,24)	698.11 (248,24)	649.48 (219, 8)
3(93.91, 78.07)	830.97 (95, 8)	596.90C (281, 8)	583.95 (272, 8)	550.21 (12, 8)	516.31C (192,24)
4(94.18, 75.70)	799.06 (272, 8)	693.24 (115,24)	624.03 (286, 8)	513.98 (116, 8)	504.18 (272,16)
5(92.80, 76.85)	820.44 (116,24)	754.89 (213, 8)	686.26 (142, 8)	650.99 (305, 8)	618.34 (181, 8)
6(95.00, 73.80)	851.76 (33,24)	681.77 (256, 8)	625.60 (149, 8)	603.39 (218,24)	596.03 (13, 8)
7(93.87, 73.40)	727.14C (304, 8)	688.81C (312, 8)	684.81 (169,24)	651.76 (283,24)	628.40C (281, 8)
8(96.84, 72.25) *	955.77 (303,24)	615.85 (362, 8)	611.81 (217,24)	592.90 (290, 8)	534.09 (822, 8)
9(93.00, 74.00)	908.94 (33,24) *	782.61 (149, 8)	740.58 (256, 8)	643.04 (12,24)	621.32 (13, 8)
10(95.28, 72.83)	699.95C (304, 8)	590.20C (312, 8)	428.78 (330,16)	412.13C (320, 8)	382.82C (192, 8)

FIVE HIGHEST 24-HOUR SO2 CONCENTRATIONS((ENDING ON JULIAN DAY, HOUR)
(MICROGRAMS/M**3)

RECEPTOR		1	2	3	4	5
1(99.87, 83.25)	473.01 (351,24)	397.87C (23,24)	312.37 (359,24)	291.62 (318,24)	279.15 (76,24)
2(94.40, 75.14)	499.28 (115,24)	356.29 (116,24)	336.57 (272,24)	318.05C (257,24)	286.90 (141,24)
3(93.91, 78.07)	387.42 (95,24)	339.61C (274,24)	336.68 (272,24)	273.98 (12,24)	271.88 (163,24)
4(94.18, 75.70)	472.82 (272,24) *	442.20 (115,24)	399.62 (98,24)	290.89C (274,24)	289.10 (286,24)
5(92.80, 76.85) *	311.57 (305,24)	347.29 (116,24)	314.70C (142,24)	274.44 (181,24)	273.84C (366,24)
6(95.00, 73.80)	459.95 (256,24)	340.71C (33,24)	265.69 (118,24)	245.23 (34,24)	237.68 (13,24)
7(93.87, 73.40)	277.75C (312,24)	255.67C (255,24)	253.26C (304,24)	199.45 (290,24)	189.47 (149,24)
8(96.84, 72.25)	359.01 (362,24)	350.11 (217,24)	335.05C (258,24)	318.59 (303,24)	316.21 (290,24)
9(93.00, 74.00)	491.38 (256,24)	363.38C (33,24)	287.05 (118,24)	281.75 (12,24)	259.74 (149,24)
10(95.28, 72.83)	297.93C (312,24)	226.87C (304,24)	181.31 (330,24)	163.18 (163,24)	158.02 (312,24)

0FIN

APPENDIX B

```
      C                    CALMPRO                                                    PHI00010
      C          A POSTPROCESSOR FOR MPTER,CRSTER, OR ISC
      C
      C   ABSTRACT:                                                                  PHI00070
      C   CALMPRO READS DATA FROM A MET DATA FILE AND FROM                           PHI00080
      C   AN HOURLY CONC FILE (OUTPUT FROM MPTER, CRSTER,
      C   RAM, COMPLEX 1, OR ISC).  THE INFLUENCE OF CALMS
      C   IS ELIMINATED BY ZEROING HOURLY CONCENTRATIONS AT
      C   ALL RECEPTORS WHEN THE CORRESPONDING HOUR OF
      C   METEOROLOGICAL DATA IS CALM.
      C   THE PROGRAM OUTPUTS A MPTER FORMAT PRINTOUT OF
      C   ANNUAL AVERAGES AND HIGH FIVE 1,3,8 AND 24 HOUR
      C   AVERAGE CONCENTRATIONS AND AN ISC FORMAT TAPE.
      C AUTHOR:
      C   N.Y. PERKINS
      C   DATA MANAGEMENT SECTION
      C   REGION 1
      C   ENVIRONMENTAL PROTECTION AGENCY
      C   JFK BLDG
      C   BOSTON MA 02203
      C      PHONE:  (617) 223-4931      FTS 223-4931                                PHI00230
      C                                                                             PHI00240
      C   INPUT INFORMATION:                                                        PHI00250
      C      A) TAPE/DISK FILE OF HOURLY CONCS, ASSIGNED TO UNIT 13                 PHI00330
      C      B) CARD INPUT (SEE BELOW)
      C      C) TAPE/DISK FILE OF MET DATA, ASSIGNED TO UNIT 11
            COMMON /MR/ HMAXA(5,720,5),IDAY(5,720,5),IHR(5,720,5),CONC(720,5),
           1LN,JDAY,NR,NT,CHI(720),LINE1(20),LINE2(20),LINE3(20),RREC(720),
           2REC(720)
            COMMON /MONIND/ ATH(4),N3HR(3),N24HR(24),IGLMHR,IGLM3,IGLM24
           1,IFLAG(5,720,5),ZERO(720,4)
            DIMENSION ZSUM(720),SUM(720), SSAR(3,720), NATM(4)
            DIMENSION YAVG(720)
            DIMENSION IPER(8)
            INTEGER CALM(366,24)
            DIMENSION KST(24),TITLE(2),SPEED(24),AFV(24),MCALM(366)
            DIMENSION TEMP(24)
            CHARACTER MODEYP
            DATA STR /'0'/ ,BLNK /' '/ ,NATM /1,3,8,24/ ,ATM /1,,3,,8,,24,/     PHI00420
            DATA LM/0/,JDAY/1/
            DATA ICLMHR /0/, ICLM3 /0/,ICLM24 /0/,N3HR /3*0/,N24HR /24*0/
            DATA TITLE /'SO2','PART'/
            DATA CALM/8784*0/,MCALM/366*24/
            DATA ZERO/2880*0/,YAVG/720*0/
            WRITE (6,5432)                                                      PHI00440
         5432 FORMAT ('1',21X,'CALMPRO  1/ ')                                   PHI00450
            NAVT=4                                                              PHI00500
            IO=6                                                                PHI00810
            IN=5                                                                PHI00820
            OLDAFV=-1                                                           PHI00520
            MET=0
            WRITE(IO,2003)(I,I=1,8)
      C          READ MET DATA FILE-SKIP FIRST RECORD
            READ(11)IDUMMY
            DO 4 JDAY=1,366
            READ(11,END=6)IYEAR,IMONTH,DAY,KST,SPEED,TEMP,AFV
```

Reproduced from best available copy.

```
      I=0
C       CHECK FOR CALMS
      DO 3 J=1,24
      IF (SPEED(J) .EQ. 1.0 .AND. OLDAFV .EQ. AFV(J)) THEN
C       DECREMENT NUMBER OF NONCALM HOURS FOR THAT DAY
C       INCREMENT NUMBER CALM HOURS IN YEAR,
C           3 HRS AND 24 HRS PERIOD
        CALM(JDAY,J)=1
        NCALM(JDAY)=NCALM(JDAY)-1
      ICLMHR=ICLMHR+1
      ICLM3=ICLM3+1
      ICLM24=ICLM24+1
      END IF
C       EVERY 3 HRS SAVE NUMBER CALMS FOR THAT PERIOD AND
C       COMPUTE CALM STATISTICS
      IF (MOD(J,3) .EQ. 0)THEN
        I=I+1
        IPER(I)=ICLM3
        CALL CALMST(J)
      END IF
C       RESET LAST HOUR WIND DIRECTION
        OLDAFV=AFV(J)
3     CONTINUE
C       WRITE OUT DAILY CALM STATISTICS
      NCALM=24-NCALM(JDAY)
      WRITE(IO,2004)JDAY,NCALM,(IPER(I),I=1,8)
4   CONTINUE
5   CONTINUE
C       WRITE YEARLY CALM HOUR STATISTICS
      WRITE (6,4999)
4999  FORMAT ('1 TOTAL NUMBER OF CALM HOURS')
      WRITE (IO,5000)ICLMHR
C       WRITE 3-HR CALM STATISTICS
      WRITE (IO,5001)(I,I=1,3)
      WRITE (IO,5002)M3HR
C       WRITE 24-HR CALM STATISTICS
      WRITE (IO,5003)(J,J=1,24)
      WRITE (IO,5004)M24HR
C
C       DETERMINE WHICH MODEL TYPE
C     READ HEADER RECORDS
C
C     MODTYP IS MODEL TYPE (M FOR MPTER, C FOR CRSTER,
C                           I FOR ISC, S FOR NET STATISTICS)
C     IP IS 1 FOR SO2, 2 FOR PARTICULATES
C     NT IS TOTAL NUMBER OF HOURS (ISC AND CRSTER ONLY)
C     NR IS NUMBER OF RECEPTORS (ISC AND CRSTER ONLY)
C     NGROUP IS NUMBER OF GROUPS (ISC ONLY)
C     JTAP IS 1 IF TAPE OUTPUT DESIRED
C     ISW15 IS 1 IF ANNUAL AVERAGES SHOULD BE WRITTEN TO TAPE
      READ (IN,2003)MODTYP,IP,NT,NR,NGROUP,JTAP,ISW15
C     IF ONLY NET STATISTICS DESIRED, THEN END RUN
      IF(MODTYP .EQ. 'S') STOP
      IF(MODTYP .EQ. 'M') CALL MINPUT(0)
C       WRITE THE NUMBER OF RECEPTORS, NR                          PMI00640
      WRITE (IO,240) NR                                          PMI00650
C       INITIALIZE                                                 PMI00660
```

```
      NGR=1
    7 JDAY=1
      NP1=0
      NP8=0
      NP24=0
      ICLM=0
      NHR=0
      LCHK=0                                                          PHI00680
      DO 30 K=1,720                                                   PHI00700
      SUM(K)=0.                                                       PHI00710
      DO 20 L=1,5                                                     PHI00720
      CONC(K,L)=0.                                                    PHI00730
      DO 10 J=1,5                                                     PHI00740
      IHR(J,K,L)=0                                                    PHI00750
      IDAY(J,K,L)=0                                                   PHI00760
   10 HMAXA(J,K,L)=0.                                                 PHI00770
   20 CONTINUE                                                        PHI00780
   30 CONTINUE                                                        PHI00790
      DO 50 I=1,720                                                   PHI00800
      DO 40 J=1,2                                                     PHI00810
   40 STAR(J,I)=BLNK                                                  PHI00820
   50 CONTINUE                                                        PHI00830
   55 CONTINUE                                                        PHI00840
C        START LOOP FOR ALL HOURS.
      DO 120 IHR=1,NT                                                 PHI00850
C        SET UP CHECK VALUE.                                          PHI00860
      LCHK=LCHK+1                                                     PHI00870
      IF (LCHK.GT.24) LCHK=LCHK-24                                    PHI00880
C        READ DATA FOR ONE HOUR                                       PHI00890
      IF (MODTYP .EQ. 'M') CALL MINPUT(1)                             PHI00900
      IF (MODTYP .EQ. 'I') CALL IINPUT(NGR)
      IF (MODTYP .EQ. 'C') CALL CINPUT
      IF (JDAY .EQ. -1) GO TO 125
C        CHECK TO SEE THAT HOUR MATCHES WHAT IS EXPECTED.             PHI00920
      IF (LH.EQ.LCHK) GO TO 60                                        PHI00930
C        WRITE ERROR MESSAGE.                                         PHI00940
      WRITE (IO,280) LCHK,LH                                          PHI00950
      STOP                                                            PHI00960
C        INCREMENT COUNT OF HRS PROCESSED.                            PHI00970
   60 NHR=NHR+1                                                       PHI00980
C
C     FLAG EVERY AVERGE FOR ALL RECEPTORS FOR THIS HOUR.
C     ZERO CONCENTRATION
      IF (CALM(JDAY,LH) .EQ. 1) THEN
C     IF THERE ARE ANY CALM HOURS, ALL ANNUAL AVERAGES
C     WILL BE FLAGGED.
        DO 65 I = 1,NR
        YAVG(I)='C'
          DO 63 M=1,4
          ZERO(I,M)='C'
   63     CONTINUE
        CHI(I)=0.
   65   CONTINUE
      END IF
C     CONVERT TO MICROGRAMS, AND WRITE IAC FORMAT TAPE
      IF (JTAP .EQ. 1) THEN
      DO 70 I=1,NR
```

```
      TSUM(I)=CHI(I)*1000000.
   70 CONTINUE
      WRITE (13) LH,JDAY,NCR,(TSUM(I),I=1,NR)
      END IF
C       DO FOR ALL RECEPTORS                                          PHI00990
      DO 80 K=1,NR                                                   PHI01000
      A=CHI(K)                                                       PHI01010
      DO 70 L=1,NAVT                                                 PHI01020
   70 CONC(K,L)=CONC(K,L)+A                                          PHI01030
C       ADD FOR LENGTH-OF-RECORD AVERAGE.                             PHI01040
   80 SUM(K)=SUM(K)+A                                                PHI01050
C       CALL RANK AT END OF EACH PERIOD SO THAT HI-5 WILL BE STORED   PHI01060
      CALL RNKS (1)                                                  PHI01070
      NP1=NP1+1                                                      PHI01080
      IF (NP1.NE.3) GO TO 90                                         PHI01090
      CALL RNKS (2)                                                  PHI01100
      NP1=0                                                          PHI01110
   90 NP8=NP8+1                                                      PHI01120
C       INCREMENT NUMBER OF CALMS IN THE PERIOD
      IF (CALM(JDAY,LH) .EQ. 1)ICLM8=ICLM8+1
      IF (NP8.NE.6) GO TO 100                                        PHI01130
      ATM(3)=AMAX0(6,(8-ICLM8))
C       COMPUTE 8-HR AVERAGE BASED ON LARGER OF
C       6 HRS OR NUMBER OF NONCALM HOURS
      CALL RNKS (3)                                                  PHI01140
      ICLM8=0
      NP8=0                                                          PHI01150
  100 NP24=NP24+1
      IF (NP24 .NE. 24) GO TO 120
      ATM(4)=AMAX0(18,NCALM(JDAY))
C       COMPUTE 24-HR AVERAGE BASED ON LARGER OF
C       18 HRS OR NUMBER OF NONCALM HOURS
      CALL RNKS (4)
      NP24=0
  120 CONTINUE
C           STORE HIGH 2 IN ARRAY FOR FUTURE YEARS
C
C       END OF HOURLY LOOP                                            PHI01260
C       START PRINTOUT OF TABLE.                                      PHI01270
  125 CONTINUE
      IF (MODTYP .EQ. 1HI) WRITE (IO,1400) LINE1,LINE2,LINE3         PHI01280
C       DETERMINE AVG CONC FOR LENGTH OF RECORD                       PHI01290
C       AND LABEL HIGHEST WITH AN ASTERISK.                           PHI01300
C     BASED ON NUMBER OF NONCALM HOURS
      SUM(1)=SUM(1)/(NHR-ICLMHR)                                     PHI01310
      A=SUM(1)                                                       PHI01320
      MX=1                                                           PHI01330
      DO 130 K=2,NR                                                  PHI01340
      SUM(K)=SUM(K)/(NHR-ICLMHR)                                     PHI01350
      IF (SUM(K).LE.A) GO TO 130                                     PHI01360
      MX=K                                                           PHI01370
      A=SUM(K)                                                       PHI01380
  130 CONTINUE                                                       PHI01390
      STAR(1,MX)=STR                                                 PHI01400
C       THESE ARE HARD CODED FOR THE TIME BEING
C
      DAY1A=1.
```

B-4

30

```
      228            HR1=1.
      229            DAY2=NT/24.
      230            HR2=24.
      231      C      WRITE LENGTH OF RECORD AVERAGES
      232            WRITE (IO,1740) DAY1A,HR1,DAY2,HR2
      233            DO 140 K=1,NR                                          PHI01410
      234            WRITE (IO,1750) K,RREC(K),SREC(K),STAR(1,K),SUN(K),SAVG(K)  PHI01420
      235        140 CONTINUE
      236      C      CONVERT TO MICROGRAMS, AND WRITE IAC FORMAT TAPE
      237            IF (JTAP .EQ. 1) THEN
      238              IF (ISW18 .EQ. 1) THEN
      239                NHOURS=24
      240                NTDAY=NT/NHOURS
      241                DO 143 K=1,NR
      242                TSUN(K)=SUN(K)*1000000.
      243        143     CONTINUE
      244                WRITE(13)NHOURS,NTDAY,NGROUP,(TSUN(K),K=1,NR)
      245              END IF
      246              ENDFILE 13
      247              ENDFILE 13
      248            END IF
      249            STAR(1,NX)=BLNK
      250      C        WRITE TABLE OF HIGH-FIVE CONCENTRATIONS              PHI01440
      251      C        FOR EACH AVERAGING TIME.                             PHI01450
      252            DO 210 L=1,NAVT                                        PHI01460
      253      C        FIND RECEPTOR WITH HIGHEST CONCENTRATION AND RECEPTOR WITH  PHI01470
      254      C        SECOND HIGHEST CONC FOR EACH AVERAGING TIME AND LABEL EACH  PHI01480
      255      C        WITH AN ASTERISK.                                    PHI01490
      256            K1=1                                                   PHI01500
      257            K2=1                                                   PHI01510
      258            A=HMAXA(1,1,L)                                         PHI01520
      259            B=HMAXA(2,1,L)                                         PHI01530
      260            DO 190 K=2,NR                                          PHI01540
      261            IF (HMAXA(1,K,L).LE.A) GO TO 180                       PHI01550
      262            A=HMAXA(1,K,L)                                         PHI01560
      263            K1=K                                                   PHI01570
      264        180 IF (HMAXA(2,K,L).LE.B) GO TO 190                       PHI01580
      265            B=HMAXA(2,K,L)                                         PHI01590
      266            K2=K                                                   PHI01600
      267        190 CONTINUE                                               PHI01610
      268            STAR(1,K1)=STR                                         PHI01620
      269            STAR(2,K2)=STR                                         PHI01630
      270      C        PRINT TABLE OF HIGH-FIVE CONCENTRATIONS FOR THIS AVERAGING TIME  PHI01640
      271            WRITE (IO,1760) MATH(L),TITLE(IP),(Y,I=1,5)            PHI01650
      272            DO 200 K=1,NR                                          PHI01660
      273            WRITE (IO,1770) K,RREC(K),SREC(K),(ATAR(J,K),          PHI01670
      274           1 HMAXA(J,K,L),IFLAG(J,K,L),IDAY(J,K,L),IHR(J,K,L),J=1,2),  PHI01680
      275           2(HMAXA(J,K,L),IFLAG(J,K,L),IDAY(J,K,L),IHR(J,K,L),J=3,5)  PHI01690
      276        200 CONTINUE                                               PHI01700
      277            STAR(1,K1)=BLNK                                        PHI01710
      278            STAR(2,K2)=BLNK                                        PHI01720
      279        210 CONTINUE                                               PHI01730
      280      C        DO NEXT GROUP OF RECEPTORS                           PHI01740
      281      C        NOT TESTED FOR MORE THAN 1 GROUP                     PHI01750
      282      C                                                             PHI01760
      283            IF (NGR .LT. NGROUP) THEN                              PHI01770
      284              NGR=NGR+1                                            PHI01780
                                                                            PHI01790
                                                                            PHI01800
                                                                            PHI07200
```

```
      REWIND 13
      GO TO 7
    ELSE
      STOP
    END IF
C
220 FORMAT (1H0,T40,'CALMPRO '/1X,T10,'PROGRAM DETERMIN                    PHI01820
     1ES AND OUTPUTS A TABLE OF ','CONCENTRATIONS FOR 4 OR 8 AVG TIMES.'PHI01840
     2)                                                                   PHI01850
240 FORMAT ('1',T10,I4,' STATIONS WILL BE PROCESSED ','IN THIS RUN OF PHI01860
     1CALMPRO.')                                                          PHI01870
260 FORMAT (1X,' HOUR EXPECTED = ',I4,' DOES NOT ','MATCH THE HOUR REAPHI01880
     1D OFF TAPE =',I4,' EXECUTION TERMINATED!')                          PHI01890
1001 FORMAT (I2,I2,I3,2I3)
1400 FORMAT ('0',T40,' '/1X,20A4/1X,20A4/1X,20                            C1X13950
     1A4)                                                                 C1X13960
1740 FORMAT ('0',T9,'      RECEPTORS'//1X,'RECEPTOR    IDENTIFICATION  C1X15050
     1EAST     NORTH     RECEPTOR HT     RECEPTOR GROUND LEVEL',T99,'AVGC1X15060
     2 CONC FOR PERIOD'/1X,T30,'COORD',T39,'COORD  ABV LOCAL GND LVL    C1X15070
     3   ELEVATION',T94,'DAY',F4.0,'HR',F4.0,' TO DAY',F4.0,'HR',F3.0/1XC1X15080
     4,T31,'(USER UNITS)      (METERS)          (USER MT UNITS)',T100,'C1X15090
     5(MICROGRAMS/M**3)'/1X)                                              C1X15100
1750 FORMAT (1X,I3,I3,I3,3X,F9.2,3X,F9.2,3X,F9.2,T110,A1,6PF7.           C1X15120
     12,1X,A1)
1760 FORMAT (1H0,T41,'FIVE HIGHEST ',I2,'-HOUR ',A4,' CONCENTRATIONS'//2XC1X15130
     1,'BEGINNING ON JULIAN DAY, HOUR)'/1X,T85,'(MICROGRAMS/M**3)'//2X,'RECEPTC1X15140
     2OR ',T30,4('DAY',20X),'HR'/1X)                                      C1X15150
1770 FORMAT (1H ,2X,I3,'(',F7.2,',',F7.2,')',2(1X,A1,6PF9.2,A1,1X,'(', C1X15160
     1I3,',',I2,')'),3(8X,6PF9.2,A1,1X,'(',I3,',',I2,')'))               C1X15170
2002 FORMAT (A1,I1,3I6,2I1)
2003 FORMAT(' DAY',' & CALMS ',8(' D',I1))
2004 FORMAT(1X,I3,6X,I2,1X,8(I3))
5000 FORMAT(1X,T10,I4)
5001 FORMAT(1H0,' NUMBER OF 3-HR PERIODS WITH '/
     X 1X,T3,3I4,' CALM HRS')
5002 FORMAT(1X,T3,3I4)
5003 FORMAT(1H0,' NUMBER OF 24-HR PERIODS WITH '/
     X 1X,T3,5I4,19I3,' CALM HRS')
C
      END                                                                 PHI02020
**                                                                        PHI02030
```

B-6

33

1234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901

```
      1            SUBROUTINE RNKS (L)
      2      C
      3      C                  SUBROUTINE RNKS   , PART OF CALMPRO,                    PHI02040
      4      C       SUBROUTINE RNKS IS CALLED BY CALMPRO AND IS DESIGNED               PHI02050
      5      C       TO ARRANGE CONCENTRATION ARRAYS SO THAT HIGH-FIVE                  PHI02060
      6      C       CONCENTRATION TABLES CAN BE OUTPUT,                                PHI02070
      7      C            OUTPUT VARIABLES:                                             PHI02080
      8      C                 HMAXA(J,K,L) : CONCENTRATION ARRAY FOR                   PHI02090
      9      C                      J = RANK OF THE CONCENTRATION (1 - 5)               PHI02100
     10      C                      K = RECEPTOR NUMBER                                PHI02110
     11      C                      L = AVERAGING TIME                                 PHI02120
     12      C                 IDAY(J,K,L) : DAY OF CONCENTRATION                      PHI02130
     13      C                 IHR(J,K,L)  : HR OF ENDING CONC                         PHI02140
     14      C                 IFLAG(J,K,L): ARRAY OF FLAGS OF ZEROED CONC             PHI02150
     15
     16            COMMON /HR/ HMAXA(5,720,5),IDAY(5,720,5),IHR(5,720,5),CONC(720,5),  PHI02160
     17           1LN,JDAY,NR,NS,CNI(720),LINE1(20),LINE2(20),LINE3(20),RREC(720),
     18           2REC(720)
     19            COMMON /ROUND/ ATN(4),N3HR(3),N24HR(24),ICLNHR,ICLN3,ICLN24
     20           1,IFLAG(5,720,5),ZERO(720,4)
     21            IOU=6
     22            DO 50 K=1,NR                                                       PHI02180
     23      C      COMPUTE AVERAGE CONCENTRATION                                     PHI02200
     24            CONC(K,L) = CONC(K,L)/ATN(L)
     25            IF (CONC(K,L).LE.HMAXA(5,K,L)) GO TO 50
     26            DO 10 J=1,5                                                        PHI02210
     27      C        IF (CONC(K,L).GT.HMAXA(J,K,L)) GO TO 20                         PHI02220
     28      C           CONCENTRATION IS ONE OF THE TOP FIVE                         PHI02230
     29           10   CONTINUE                                                       PHI02240
     30                WRITE (IO,70)                                                 PHI02250
     31                GO TO 50                                                      PHI02260
     32      C         THE FOLLOWING DO-LOOP HAS THE EFFECT OF INSERTING A NEW       PHI02270
     33      C         CONCENTRATION ENTRY INTO ITS PROPER POSITION WHILE SHIFTING   PHI02280
     34      C         DOWN THE 'OLD' LOWER CONCENTRATIONS THUS ESTABLISHING THE     PHI02290
     35           20   'HIGH-FIVE' CONCENTRATION TABLE.                              PHI02300
     36                IF (J.EQ.5) GO TO 40                                          PHI02310
     37                DO 30 IJ=4,J,-1                                               PHI02320
     38                IJP1=IJ+1                                                     PHI02330
     39                HMAXA(IJP1,K,L)=HMAXA(IJ,K,L)                                 PHI02340
     40                IFLAG(IJP1,K,L)=IFLAG(IJ,K,L)                                 PHI02350
     41           30   IDAY(IJP1,K,L)=IDAY(IJ,K,L)                                   PHI02350
     42      C         IHR(IJP1,K,L)=IHR(IJ,K,L)                                     PHI02360
     43      C            INSERT LATEST CONC, DAY AND START HR INTO THE              PHI02370
     44           40      PROPER RANK IN THE HIGH-FIVE TABLE                         PHI02380
     45                HMAXA(J,K,L)=CONC(K,L)                                        PHI02390
     46                IFLAG(J,K,L)=ZERO(K,L)                                        PHI02400
     47                IDAY(J,K,L)=JDAY
     48                IHR(J,K,L)=LH                                                 PHI02410
     49           50   CONTINUE                                                      PHI02420
     50                DO 60 K=1,NR                                                  PHI02430
     51                CONC(K,L)=0.                                                  PHI02440
     52                ZERO(K,L)=' '                                                 PHI02450
     53           60   CONTINUE
     54                RETURN
     55      C                                                                       PHI02460
     56           70   FORMAT (1X,'    ****ERROR IN FINDING THE MAX CONCENTHATION****')  PHI02470
     57      C                                                                       PHI02480
                                                                                     PHI02490
                                                                                     PHI02500
```

Reproduced from best available copy.

37 END PH102510

88

```
      SUBROUTINE CALMST(J)
C
C     THIS ROUTINE COMPUTES THE NUMBER OF 3 AND 24 HOUR
C     PERIODS WITH 1,2,3, OR 1-24 CALM HOURS, RESPECTIVELY,
C     AND THE FREQUENCY OF CALMS
C
      COMMON /WDWIND/ ATH(4),N3HR(3),N24HR(24),ICLMHR,ICLM3,ICLM24
     1,ZFLAG(5,720,5),ZERO(720,4)
C
C     INCREMENT NUMBER OF 3 HR PERIODS WITH NUMBER CALMS = ICLM3
      IF (ICLM3 .NE. 0) THEN
         N3HR(ICLM3)=N3HR(ICLM3)+1
         ICLM3=0
      END IF
C     INCREMENT NUMBER OF 24 HR PERIODS WITH NUMBER CALMS = ICLM24
      IF (ICLM24 .NE. 0 .AND. MOD(J,24) .EQ. 0) THEN
         N24HR(ICLM24)=N24HR(ICLM24)+1
         ICLM24=0
      END IF
      RETURN
      END
```


Reproduced from best available copy.

```
      SUBROUTINE IINPUT(NGR)
C      THIS SUBROUTINE WILL READ ISC FORMAT INPUT TAPE
      COMMON /HR/ HMAXA(5,720,5),IDAY(5,720,5),IHR(5,720,5),CONC(720,8),
     1LH,JDAY,HR,NT,CHI(720),LINE1(20),LINE2(20),LINE3(20),HREC(720),
     2REC(720)
   10 READ (12,END=100)LH,JDAY,IG,(CHI(I),I=1,HR)
C      IF WRONG GROUP, READ NEXT RECORD
C
      IF (NGR .NE. IG) GO TO 10
C      CONVERT FROM MICROGRAMS TO GRAMS
      DO 50 I=1,HR
      CHI(I)=CHI(I)/1000000.
   50 CONTINUE
      RETURN
  100 CONTINUE
      JDAY=1
      END
```


36

```
      SUBROUTINE MINPUT(ISTART)
C
C     THIS SUBROUTINE READS HOURLY CONCENTRATIONS FROM
C     MPTER FORMAT TAPE
C
      COMMON /MR/ MMAXA(5,720,5),IDAY(5,720,5),IHR(5,720,5),CONC(720,5),
     1LH,JDAY,NR,NT,CHI(720),LINE1(20),LINE2(20),LINE3(20),RREC(720),
     2SREC(720)
      IF (ISTART .EQ. 0) THEN
C        READ FIRST TWO RECORDS FROM HOURLY FILE.                    PMI00610
      READ (12,END=100) NPER,NAVG,LINE1,LINE2,LINE3                  PMI00620
      READ (12,END=100) NR,(RREC(I),I=1,NR),(SREC(J),J=1,NR)         PMI00630
C      NUMBER OF DAYS TIMES NUMBER OF AVERAGES PER DAY
      NT=NPER*NAVG
      ELSE
        READ (12,END=100) JDAY,LH,(CHI(I),I=1,NR)
      END IF
      RETURN
  100 CONTINUE
      JDAY=-1
      END
```

```
      SUBROUTINE CINPUT
C     THIS SUBROUTINE WILL READ CHSTER FORMAT
C                INPUT TAPE
      COMMON /MR/ MMAXA(5,720,5),IDAY(5,720,5),IHR(5,720,5),CONC(720,5),
     1LH,JDAY,NR,NT,CHI(720),LINE1(20),LINE2(20),LINE3(20),RREC(720),
     2RREC(720)
      LH=LH+1
      READ (12,END=100) (CHI(I),I=1,NR)
C     IF THIS IS DAILY AVERAGE RECORD, SKIP IT AND READ
C     FIRST RECORD FOR NEXT DAY.
      IF (MOD(LH,25) .EQ. 0) THEN
         READ(12,END=100) (CHI(I),I=1,NR)
         LH=1
         JDAY=JDAY+1
      END IF
      RETURN
  100 CONTINUE
      JDAY=-1
      END
```

Technical Support Branch (ATS-2310)
Air Management Division, Region I
U. S. Environmental Protection Agency
J.F.K. Building
Boston, MA 02203

I would like to receive future revisions to the CALMPRO User's Guide.

Name _____

Organization _____

Address _____

City _____

State _____

Zip Code _____

Phone _____

Date _____